

### AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of viewing compositional inhomogeneities in  
~~generating a representation of the compositional distribution of a chemical sample as a function of~~  
~~depth for facilitating an analysis of the quality of the chemical sample, the method~~ comprising:

irradiating the sample with radiation having a plurality of frequencies in the range from  
25GHz to 100THz;

detecting radiation reflected from and/or transmitted by said sample to obtain a time  
domain waveform;

obtaining frequency data as a function of time from the time domain waveform; and

deriving an image ~~the representation~~ from the frequency data, wherein variations in the  
frequency data result in inhomogeneities in the image indicating compositional inhomogeneities of  
the chemical sample. the representation shows whether the compositional distribution is uniform.

2. (Currently amended) A method of viewing a ~~generating a representation of the~~  
granularity of a chemical sample as a function of depth ~~for facilitating an analysis of the quality of~~  
~~the chemical sample, the method~~ comprising:

irradiating the sample with radiation having a plurality of frequencies in the range from  
25GHz to 100THz;

detecting radiation reflected from and/or transmitted by said sample to obtain a time  
domain waveform;

obtaining frequency data as a function of time from the time domain waveform; and

deriving an image ~~the representation~~ from the frequency data, wherein variations in the  
frequency data result in inhomogeneities in the image indicating variations in granularity of the  
chemical sample ~~the representation shows whether the granularity is uniform.~~

3. (Previously presented) The method according to claim 1 wherein the sample is a pharmaceutical sample.

4. (Previously presented) The method of claim 1 wherein frequency data as a function of time is obtained from the time domain waveform using a Gabor transform.

5. (Original) The method of claim 4 wherein the Gabor transform is implemented using a windowed Fourier transform, a correlation of a specific kernel function or a filter-bank.

6. (Previously presented) The method of claim 4 further comprising applying the Gabor function to the time domain waveform and selecting frequency, window type and/or window width of the Gabor function to optimise spectral or temporal features.

7. (Currently amended) The method according to claim 1 wherein the image compositional distribution representation is a three dimensional representation of compositional distribution.

8. (Currently amended) The method according to claim 1 further comprising:  
  
subdividing the sample to be imaged into a two-dimensional array of pixels,  
  
detecting radiation from each pixel; obtaining a time domain waveform for each pixels;  
  
and

obtaining frequency data as a function of time for each pixel from the respective time domain waveforms;

deriving an image representation as a function of depth at each pixel from the respective frequency data; and

combining the images representations for each pixel into a three dimensional compositional distribution image representation for the sample.

9. (Currently amended) The method according to claim 1 further comprising:

subdividing the sample to be imaged into a two-dimensional array of pixels,  
  
detecting radiation from each pixel;  
  
obtaining frequency data as a function of time for each pixel from the respective time domain waveforms;  
  
deriving a cross-sectional compositional ~~representation~~ image from the respective frequency data.

10. (Previously presented) The method of claim 1 wherein the radiation is pulsed.

Claims 11-13. (Canceled)

14. (Withdrawn) The method according to claim 1 as used in a pharmaceutical manufacturing process.